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## (54) FLAME RETARDANT RESIN COMPOSITION

## (57)Abstract:

PURPOSE: To obtain a flame resistant resin composition, excellent in molding processability and flame retardance and having a white hue without deteriorating mechanical performances by adding ammonium polyphosphate, compound containing polyhydric hydroxyl groups, a compound containing the triazine ring and a metallic hydroxide together as flame retardants.

CONSTITUTION: This composition is obtained by blending (A) 100 pts.wt. resin with (B) 10-25 pts.wt. ammonium polyphosphate (preferably having  $\leq 40\mu\text{m}$  average particle diameter and  $\geq 1\text{g}$  dissolved amount after 30min when dispersed in 90ml water at  $25^\circ\text{C}$ ), (C) 1-15 pts.wt. compound containing polyhydric hydroxyl groups (preferably dipentaerythritol, etc.), (D) 1-10 pts.wt. compound containing the triazine ring (e.g. melamine) and (E) 0.1-5 pts.wt. metallic hydroxide (preferably magnesium hydroxide, etc.). Furthermore, the average particle diameter of the components (C) to (E) is preferably respectively  $\leq 40\mu\text{m}$  and the average particle diameter of the components (C) and (D) is preferably smaller than that of the component (B).

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**CLAIMS**

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**[Claim(s)]**

[Claim 1] As opposed to the resin 100 weight section A ammonium polyphosphate 10 - 25 weight section B multiple-valued hydroxyl group-containing compound 1 - 15 weight section C triazine ring content compound 1 - 10 weight section D metal hydroxide Flame-retardant-resin constituent containing 0.1 - 5 weight section.

[Claim 2] The flame-retardant-resin constituent according to claim 1 which the mean particle diameter of ammonium polyphosphate is 40 micrometers or less, and is characterized by the amount of dissolutions of 30 minutes after being 1g or less when distributing 10g in 90ml of 25-degree C water.

[Claim 3] The flame-retardant-resin constituent according to claim 1 with which multiple-valued hydroxyl group-containing compound is chosen from pentaerythritol, dipentaerythritol, tripentaerythritol, tris hydroxyethyl isocyanurate, a glycerol, and a polyethylene glycol.

[Claim 4] The flame-retardant-resin constituent according to claim 1 with which a metal hydroxide consists of a kind of a magnesium hydroxide, a calcium hydroxide, a barium hydroxide, an aluminum hydroxide, zinc hydroxide, and a hydrotalcite, or two sorts or more.

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**DETAILED DESCRIPTION**

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**[Detailed Description of the Invention]****[0001]**

**[Industrial Application]** This invention relates to the flame-retardant-resin constituent by which flameproofing was carried out by the non-halogen system flame retarder which has advanced fire retardancy, though the mechanical engine performance of resin is maintained. It is related with the flame-retardant-resin constituent by which used together ammonium polyphosphate, multiple-valued hydroxyl group-containing compound, the triazine ring content compound, and the metal hydroxide as a flame retarder in detail, and flameproofing was carried out.

**[0002]**

**[Description of the Prior Art]** Conventionally, since resin is excellent in electrical characteristics and a mechanical strength, it is used abundantly at home \*\*\*\*\*, electric electronic parts, a building, autoparts, etc. However, it is easy to burn and fire-resistant regulation on a resin ingredient has been carried out for various applications from generating a toxic gas at the time of combustion. Although the halogen system flame retarder has been conventionally used abundantly as a flame retarder used for this, generating of the corrosive gas at the time of combustion and a toxic gas poses a problem; and the needs of not halogenating [ of a flame retarder ] are increasing recently.

**[0003]** The non-halogen system flame retarder by which current use is carried out mainly gets down from a metal hydroxide system, and an aluminum hydroxide or a magnesium hydroxide is mentioned to this. However, these cannot demonstrate fire retardancy, if it does not add so much to resin, therefore they have the fault of bringing about the molding workability and mechanical performance degradation of resin. Moreover, there are also problems, such as bleeding of resin, for the hygroscopicity of a metal hydroxide.

**[0004]** Furthermore, in JP,54-22450,A which is the system which used ammonium polyphosphate for the flame retarder, although the combination of polyolefin resin, ammonium polyphosphate, a magnesium hydroxide, or an aluminum hydroxide is proposed, if the addition of a flame retarder is not made into 60 weight sections and a large quantity to the resin 100 weight section, desired fire retardancy is not acquired but the problem that degradation of the molding workability of resin and the mechanical engine performance of resin is unavoidable remains.

**[0005]** Moreover, although the fire-resistant constituent is indicated by JP,2-127446,A in the combination of the polymer which does not contain a halogen, a foaming stratification agent, a carbonization stratification agent, and a metal hydrate, if a foaming stratification agent, a carbonization stratification agent, and a metal hydrate are not added more than the 110 weight sections in the resin 100 weight section, advanced fire retardancy is not acquired and the fall of resin physical properties cannot be avoided.

**[0006]** Then, these people proposed the constituent which consists of ammonium polyphosphate, multiple-valued hydroxyl group-containing compound, and a nitrogen content compound as a flame-retarder constituent which obtains fire-resistant high resin with a previously comparatively small addition (Japanese Patent Application No. No. 207041 [ six to ]). However, this resin constituent had the trouble that a molding object colored, although advanced fire retardancy was acquired with resin physical properties held.

[0007] Then, V-0 of UL can be attained by comparatively small addition number of copies to resin, and the hue of a molding object is white, and this invention aims at offering the flame-retardant-resin constituent which also maintained resin physical properties further.

[0008]

[Means for Solving the Problem] As a result of repeating examination wholeheartedly, when this invention persons used together and used ammonium polyphosphate, multiple-valued hydroxyl group-containing compound, the triazine ring content compound, and the metal hydroxide as a flame retarder that the above-mentioned problem should be solved, desired fire retardancy was acquired by addition number of copies comparatively smaller than the conventional technique, and hue of resin is white, and molding workability is also good, they find out that the mechanical strength of resin is further maintainable, and came to complete this invention.

[0009] That is, this invention is A ammonium polyphosphate to the resin 100 weight section. 10 - 25 weight section, B multiple-valued hydroxyl group-containing compound 1 - 15 weight section, C triazine ring content compound 1 - 10 weight section, D metal hydroxide It is a flame-retardant-resin constituent containing 0.1 - 5 weight section.

[0010] This invention is explained to a detail below.

[0011] The resin used by this invention is polyethylene, the poly PUROHI pyrene, ethylene/propylene copolymer, polybutene -1, and the poly methyl pentene as polyolefine system resin. Ethylene / acrylic ester copolymer, and ethylene/ It is polystyrene as styrene resin, such as a vinyl acetate copolymer and the poly cycloolefin. High impact polystyrene, ABS plastics, MBS resin, an AS resin, and styrene / methyl methacrylate copolymer can be used. As thermoplastic polyester resin, they are polyethylene terephthalate and polybutylene terephthalate. Polyphenylene oxide, polyphenylene oxide / high-impact-polystyrene blend resin, polycarbonate resin, a polycarbonate/ABS plastics, etc. are mentioned as 6-nylon, 6, and 6-nylon and polyether resin as polyamide resin.

[0012] When distributing 10g in the mean particle diameter of 40 micrometers or less, and 90ml of 25-degree C water, that whose amount of dissolutions of 30 minutes after is 1g or less is suitable for the ammonium polyphosphate used by this invention. When the mean particle diameter of ammonium polyphosphate is larger than 40 micrometers, the fall of the mechanical strength of about [ that the dispersibility over resin worsens and advanced fire retardancy may be unable to be acquired ] and molding resin may be brought about. Moreover, if the above-mentioned amount of dissolutions exceeds 1g, in order that the resin after molding may carry out bleeding, it becomes the cause of a mechanical-strength fall. As ammonium polyphosphate of the commercial item equipped with such a property, EXOLIT462 (Hoechst A.G. make) etc. can be illustrated as surface coating mold ammonium polyphosphate which controlled EXOLIT422 (Hoechst A.G. make), Phoscheck30 (Monsanto Co. make), and also hygroscopicity.

[0013] It is desirable still more desirable to carry out 10-25 weight section addition to the resin 100 weight section, and the ammonium polyphosphate used by this invention is 15 - 20 weight section. When there is less amount of the ammonium polyphosphate used than 10 weight sections, since advanced fire retardancy cannot be demonstrated, it is not desirable. Moreover, when the amount of the ammonium polyphosphate used exceeds 25 weight sections, fire retardancy does not improve so much but brings about the mechanical performance degradation of resin rather.

[0014] The multiple-valued hydroxyl group-containing compound used by this invention is pentaerythritol, dipentaerythritol, tripentaerythritol, and the poly pentaerythritol. Tris hydroxyethyl isocyanate They are a polyethylene glycol, a glycerol, starch, grape sugar, a cellulose, a sorbitol, etc. Among these multiples-valued hydroxyl group-containing compound, a polyhydric-alcohol compound has the good familiarity by resin, it is desirable low-water-flow solubility and in respect of low hygroscopicity, and since dipentaerythritol, tripentaerythritol, and the poly pentaerythritol (condensation whenever  $\geq 4$ ) have water solubility and especially low hygroscopicity, it especially fits this invention.

[0015] For such mean particle diameter, although it is desirable that it is 40 micrometers or less, the one especially smaller than the mean particle diameter of ammonium polyphosphate is Pori Lynn. A wrap thing can do the front face of acid ammonium, and it is desirable the point on a

fire-resistant disposition. When the mean particle diameter of multiple-valued hydroxyl group-containing compound is larger than 40 micrometers, the distributed degree in resin may become low, and may be difficult to get in advanced fire retardancy, and may bring about the mechanical performance degradation of resin.

[0016] As the amount used, the range of 1 - 15 weight section is desirable still more desirable to the resin 100 weight section, and 5 - 15 weight section is suitable for these multiples-valued hydroxyl group-containing compound. When addition number of copies to resin is under 1 weight section, advanced fire retardancy cannot be acquired. Conversely, when 15 weight sections are exceeded, although fire retardancy improves, a superfluous hydroxyl group dissolves a part of ammonium polyphosphate, and hue aggravation of resin is brought about.

[0017] As a triazine ring content compound in this invention, it is melamine, AMMERIN, MERAMU, bends guanamine, acetoguanamine, FUTAROJI guanamine, melamine SHIANU rate, pyrophosphoric-acid melamine, butylene jig ANAMIN, norbornene jig ANAMIN, methylene dimelamine, ethylene dimelamine, trimethylene dimelamine, tetramethylen dimelamine, hexamethylene dimelamine, 1, and 3-hexylene dimelamine etc.

[0018] As for the mean particle diameter of a triazine ring content compound, it is desirable that it is smaller than the mean particle diameter of ammonium polyphosphate. It is 40 micrometers or less preferably. When the mean particle diameter of a triazine ring content compound is larger than 40 micrometers, the dispersibility to resin may worsen and the mechanical strength of about [ being difficult to get ] or resin may fall advanced fire retardancy.

[0019] Addition number of copies to the resin of a triazine ring content compound is within the limits of 1 - 10 weight section to the resin 100 weight section. The case of under 1 weight section, the synergistic effect with other components cannot be demonstrated and advanced fire retardancy cannot be acquired. When exceeding 10 weight sections, fire retardancy does not improve so much but brings about the moldability of resin, and the fall of a mechanical strength rather. Since the phosphoric acid root remains into the triazine component, if a pyrophosphoric-acid melamine is used superfluously, it will also especially bring about hue aggravation of resin.

[0020] The metal hydroxides used by this invention are a magnesium hydroxide, an aluminum hydroxide, and a hydrotalcite preferably, although a magnesium hydroxide, an aluminum hydroxide, a calcium hydroxide, a hydrotalcite, a barium hydroxide, zinc hydroxide, etc. are raised. Since there is deliquescence, a sodium hydroxide, a potassium hydroxide, etc. have a possibility that problems, such as bleeding, may arise.

[0021] The mean particle diameter of a metal hydroxide has desirable 40 micrometers or less. When the mean particle diameter of a metal hydroxide is larger than 40 micrometers, the fall of the mechanical strength of about [ that the dispersibility to resin is / wrong / difficult to get in advanced fire retardancy ] or resin may be brought about.

[0022] It is the main purpose that adding a metal hydroxide makes the hue of resin white. When not adding a metal hydroxide, with the heat at the time of molding, a part of ammonium polyphosphate carries out deammonia, polyphosphoric acid is produced, polyphosphoric acid carries out a bad influence to resin, multiple-valued hydroxyl group-containing compound, or a triazine ring content compound, and hue aggravation of resin is brought about. When a metal hydroxide is added, an acid is neutralized, and a basic metal hydroxide controls hue aggravation of resin, and is considered that it can acquire a white molding object.

[0023] To the resin 100 weight section, 0.1 - 5 weight section is desirable still more desirable, and 0.5 - 3 weight section is suitable for addition number of copies to the resin of a metal hydroxide. Although fire retardancy is acquired the case of under the 0.1 weight section, hue aggravation of resin is brought about. When exceeding 5 weight sections, although the molding object is white, fire retardancy falls rapidly.

[0024] The flame-retardant-resin constituent which combined the fire retardancy which was excellent in resin with specified quantity kneading \*\*\*\*\* in the flame-retarder constituent (namely, ammonium polyphosphate, multiple-valued hydroxyl group-containing compound, a triazine ring content compound, and a metal hydroxide) of this invention, and the resin engine performance is obtained. As an approach on which it elaborates, there is especially no limit and it can adopt the usual approach. For example, it is the fire retardancy of resin and this invention

with a Henschel mixer (trade name). After mixing an agent constituent to homogeneity, the approach of carrying out melting kneading with a biaxial extruder is mentioned. It is desirable for the flame retarder of this invention to be mixture with particle diameter smaller than 40 micrometers at the time of homogeneity mixing, also when raising fire retardancy, and also when raising the surface appearance of a moldings, and mechanical physical properties. You may carry out by grinding to 40 micrometers or less, mixing [ since ammonium polyphosphate, multiple-valued hydroxyl group-containing compound, the triazine ring content compound and the metal hydroxide are ground to 40 micrometers or less before mixing, may mix, and ]. At the time of this kneading, bulking agents, such as pigments, such as a hindered phenol system anti-oxidant, a hindered amine light stabiliser, a thermostabilizer, TiO<sub>2</sub>, and carbon black, a glass fiber, and carbon fiber, etc. are also mixable to resin with this flame-retarder constituent if needed. The desirable temperature at the time of melting kneading is 250 degrees C or less.

[0025] Moreover, as for a flame-retarder constituent, it is desirable that it is below a total of 30 weight sections to the resin 100 weight section, and flame-retarder addition number of copies other than ammonium polyphosphate is below 20 weight sections. If flame-retarder sum total addition number of copies exceeds 30 weight sections, although fire retardancy improves, it causes aggravation of molding workability, and the mechanical performance degradation of resin, and is not desirable.

[0026]

[Example] An example explains the contents of this invention concretely below.

Example 1 Polypropylene (Mitsui no BUREN BJHH, Mitsui Toatsu Chemicals, Inc. make) 100 weight section Ammonium polyphosphate (Exolit 422\*1), Hoechst A.G. make 18 weight sections Dipentaerythritol (extensive Sakae chemistry company make) The 8.4 weight sections Melamine SHIANU rate (Mitsui Toatsu Chemicals, Inc. make) The 3.6 weight sections Magnesium hydroxide (Asahi Glass Co., Ltd. make) Mixture with which the amount of dissolutions of 30 minutes after when distributing 10g in the 0.9 weight section [\*1 mean particle diameter of 18 micrometers and 90ml of 25-degree-C water consists of 0.8g] Using the Henschel mixer, 5kg was created, and it kneaded and pelletized at 200 degrees C with the biaxial extruder. Injection molding after drying 2h of these pellets with a 80-degree C dryer The test piece for bend test specified by the dead 126mmx12.6mmx3.1mm piece of UL combustion test, the piece of an Izod test specified by ASTM D256, the hauling test piece specified to ASTM D638, and ASTM D790 was created.

[0027] The combustion test was performed based on the UL94 perpendicular trial. evaluation V0: -- advanced fire-resistant V2: -- a certain amount of x[ fire-resistant ]--fire-retardancy-less Izod test -- ASTM D256 -- being based -- a hauling trial -- ASTM D638 being based -- a bending test -- ASTM It carried out based on D790. A presentation and evaluation result of the flame-retardant-resin constituent in this example and future examples were shown in Table 1.

[0028] The test piece creation approach for evaluation and the evaluation approach of an example 2 - 6 fire-retardancy resin constituent are the same as an example 1. The fire-resistant resin presentation and the evaluation result were shown in Table 1.

[0029]

[Table. 1]

実施例	樹脂 (重量部)	リン酸 アモニウム (重量部)	多価水酸基 含有化合物 (重量部)	トリアジン 環化合物 (重量部)	金属水酸 化物 (重量部)	評 価				色 相
						UL94	アクト	引張	曲げ	
1	ポリカピロン 100	Exolit 422 18	ジヘキサ エリトール 8.4	メシニグレート 3.6	水酸化 カルシウム 0.9	V0	7.0	296	456	白
2	ポリカピロン 100	Exolit 422 18	トリス(ヒドロキシ メチル)アミン 8.4	メシニグレート 3.6	水酸化 カルシウム 0.9	V0	7.1	288	483	白
3	ポリカピロン 100	Exolit 422 18	ジヘキサ エリトール 8.4	ピロリン酸五水 3.6	水酸化 カルシウム 0.9	V0	7.0	301	464	白
4	ポリカピロン 100	Exolit 422 18	トリス(ヒドロキシ メチル)アミン 8.4	ピロリン酸五水 3.6	水酸化 カルシウム 0.9	V0	7.1	275	451	白
5	ポリカピロン 100	Exolit 422 18	ジヘキサ エリトール 8.4	メシニグレート 1.5	水酸化 アルミニウム 3	V0	7.0	265	460	白
6	ポリカピロン 100	Exolit 422 18	ジヘキサ エリトール 8.4	ピロリン酸五水 2.5	水酸化ナトリウム 2	V0	7.2	270	465	白

アクト試験：数値の単位[kgf/cm]

引張試験：数値の単位[kgf/cm<sup>2</sup>]

曲げ試験：数値の単位[kgf/cm<sup>2</sup>]

[0030] An evaluation result, the ammonium polyphosphate, the multiple-valued hydroxyl group-containing compound and the triazine ring of these examples When it was used in the combination of a compound and a metal hydroxide, it is UL94 to polypropylene (Mitsui no BUREN BJHH). It had the capacity which gives the fire retardancy of V0. Furthermore, the mechanical strength of molding resin could also be maintained and the hue of a molding object was white.

[0031] The presentation excluding dipentaerythritol from the presentation of example of comparison 1 example 1 estimated. The test piece creation approach for evaluation of a fire-resistant resin constituent is the same as an example 1. The fire-resistant resin presentation and the evaluation result were shown in Table 2. When dipentaerythritol was removed as a result, fire retardancy was not acquired at all.

[0032] The presentation excluding the triazine ring compound from the presentation of example of comparison 2 example 1 estimated. The test piece creation approach for evaluation of a fire-resistant resin constituent is the same as an example 1. The fire-resistant resin presentation and the evaluation result were shown in Table 2. Consequently, when the triazine ring compound was removed, advanced fire retardancy (V0) was not acquired, but was set to V2.

[0033] The presentation excluding the metal hydroxide from the presentation of example of comparison 3 example 1 estimated. The test piece creation approach for evaluation of a fire-resistant resin constituent is the same as an example 1. The fire-resistant resin presentation and the evaluation result were shown in Table 2. Although advanced fire retardancy (V0) was acquired when the metal hydroxide was removed as a result, the molding object was colored yellow.

[0034] The evaluation result at the time of making the addition of ammonium polyphosphate into 30 weight sections among the presentations of example of comparison 4 example 1 was shown in Table 2. Consequently, although advanced fire retardancy (V0) was acquired when there were too many additions of ammonium polyphosphate, the mechanical strength of resin fell extremely and the hue of a molding object also became yellow.

[0035] The evaluation result at the time of making the addition of ammonium polyphosphate into 8 weight sections among the presentations of example of comparison 5 example 1 was shown in Table 2. Consequently, since there were too few additions of ammonium polyphosphate, advanced fire retardancy (V0) was not acquired, but was set to V2.

[0036] The evaluation result in the case of 25 weight sections was shown for dipentaerythritol in Table 2 among the presentations of example of comparison 6 example 1. Although advanced fire retardancy (V0) was acquired since there was too many addition number of copies of dipentaerythritol, hue aggravation of a Plastic solid and the fall of the mechanical strength of resin took place.

[0037] The evaluation result in the case of the 0.5 weight section was shown for dipentaerythritol in Table 2 among the presentations of example of comparison 7 example 1. Since addition number of copies of dipentaerythritol was extremely low, fire retardancy was not able to be acquired at all.

[0038] The evaluation result in case the addition of a triazine ring compound is 25 weight sections among the presentations of example of comparison 8 example 1 was shown in Table 2. Although advanced fire retardancy (V0) and a white Plastic solid were acquired when there was extremely many addition number of copies of a triazine ring compound, the mechanical strength fell.

[0039] The evaluation result in case the addition of a triazine ring compound is the 0.5 weight section among the presentations of example of comparison 9 example 1 was shown in Table 2. Since there was extremely few addition number of copies of a triazine ring compound, advanced fire retardancy (V0) was not acquired, but was set to V2.

[0040] The evaluation result at the time of making the addition of a metal hydroxide into 8 weight sections among the presentations of example of comparison 10 example 1 was shown in Table 2. When there was extremely many addition number of copies of a metal hydroxide, fire retardancy was not able to be acquired at all.

[0041] The evaluation result in the case of 25 weight sections was shown for tris hydroxyethyl isocyanurate in Table 2 among the presentations of example of comparison 11 example 2. Although advanced fire retardancy (V0) was acquired since there was too many addition number of copies of tris hydroxyethyl isocyanurate, the hue of a molding object became yellow.

[0042] The evaluation result in the case of the 0.5 weight section was shown for tris hydroxyethyl isocyanurate in Table 2 among the presentations of example of comparison 12 example 2. Since addition number of copies of tris hydroxyethyl isocyanurate was extremely low, fire retardancy was not able to be acquired at all.

[0043] The evaluation result in case the addition of a triazine ring compound is 25 weight sections among the presentations of example of comparison 13 example 3 was shown in Table 2. When there was extremely many addition number of copies of a triazine ring compound, although advanced fire retardancy (V0) was acquired, it became hue aggravation of a molding object, and a mechanical-strength fall.

[0044] The evaluation result in case the addition of a triazine ring compound is the 0.5 weight section among the presentations of example of comparison 14 example 3 was shown in Table 2. Since there was extremely few addition number of copies of a triazine ring compound, advanced fire retardancy (V0) was not acquired, but was set to V2.

[0045]

[Table 2]



比較例	樹脂 (重量部)	ポリ酸 アベナム (重量部)	多価水酸基 含有化合物 (重量部)	トリアジン 環化合物 (重量部)	金属水酸 化物 (重量部)	評価				色相
						UL94	フット	引張	曲げ	
1	ポリカピロン 100	Exolit422 18	—	ポリシロキサン 3.6	水酸化 マグネシウム 0.9	×	—	—	—	白
2	ポリカピロン 100	Exolit422 18	ジヘキサ メチル 8.4	—	水酸化 マグネシウム 0.9	V2	—	—	—	白
3	ポリカピロン 100	Exolit422 18	ジヘキサ メチル 8.4	ポリシロキサン 3.6	—	V0	—	—	—	黄
4	ポリカピロン 100	Exolit422 30	ジヘキサ メチル 8.4	ポリシロキサン 3.6	水酸化 マグネシウム 0.9	V0	3.1	209	312	白
5	ポリカピロン 100	Exolit422 8	ジヘキサ メチル 8.4	ポリシロキサン 3.6	水酸化 マグネシウム 0.9	V2	—	—	—	白
6	ポリカピロン 100	Exolit422 18	ジヘキサ メチル 25	ポリシロキサン 3.6	水酸化 マグネシウム 0.9	V0	4.8	210	303	黄
7	ポリカピロン 100	Exolit422 18	ジヘキサ メチル 0.5	ポリシロキサン 3.6	水酸化 マグネシウム 0.9	×	—	—	—	白
8	ポリカピロン 100	Exolit422 18	ジヘキサ メチル 8.4	ポリシロキサン 25	水酸化 マグネシウム 0.9	V0	3.2	208	303	白
9	ポリカピロン 100	Exolit422 18	ジヘキサ メチル 8.4	ポリシロキサン 0.5	水酸化 マグネシウム 0.9	V2	—	—	—	白
10	ポリカピロン 100	Exolit422 18	ジヘキサ メチル 8.4	ポリシロキサン 3.6	水酸化 マグネシウム 8	×	—	—	—	白
11	ポリカピロン 100	Exolit422 18	トリス(4-ヒドロキシ フェニル)メタン 25	ポリシロキサン 3.6	水酸化 マグネシウム 0.9	V0	—	—	—	黄
12	ポリカピロン 100	Exolit422 18	トリス(4-ヒドロキシ フェニル)メタン 0.5	ポリシロキサン 3.6	水酸化 マグネシウム 0.9	×	—	—	—	白
13	ポリカピロン 100	Exolit422 18	ジヘキサ メチル 8.4	ポリシロキサン 25	水酸化 マグネシウム 0.9	V0	3.1	211	310	黄
14	ポリカピロン 100	Exolit422 18	ジヘキサ メチル 8.4	ビス(4-ヒドロキシ フェニル)エーサー 0.5	水酸化 マグネシウム 0.9	V2	—	—	—	白

フット試験：数値の単位[kgf/cm]  
引張試験：数値の単位[kgf/cm<sup>2</sup>]  
曲げ試験：数値の単位[kgf/cm<sup>2</sup>]

[0046]

[Effect of the Invention] The hue of resin shows white and the outstanding fire retardancy, without the flame-retardant-resin constituent of this invention having good molding workability, and the mechanical performance degradation of resin also hanging it down.

[Translation done.]